And admitting four ſuch waggons, weighing twenty tons, to ſtand abreaſt on the bridge, in which ſituation they would have the greateſt poſſible preſſure, by acting near the ſame ſpot; yet, to compreſs the part, thirty feet of the bridge, at leaſt, on each ſide, muſt riſe, and this in ſome meaſure raiſing the whole of the ſpring, which would be a weight of at leaſt one hundred tons; hence, as twenty tons cannot move one hundred, without ſuperior leverage, and as there is no leverage obtained, conſequently there is no weight which it is reaſonable to ſuppoſe can come on a bridge at one time can injure it.

The longitudinal preſſure being conſidered, the tendency to yield ſideways may be prevented, by conſtructing it wide at the ends and contracted in the centre; the preſſure will then be reſiſted by an arch in every direction. Having exhibited the conſtruction, and aſſigned my reaſons for its permanency, I hope it will eaſily be admitted, that a bridge of three hundred feet would be perfectly ſafe; but if the reader ſhould heſitate at this, he has my reaſon why it would ſtand, and it will be well to diſcover the reaſon why it would not: but ſuppoſing it admitted, that three hundred feet would be ſafe, I ſee no difference between that and one of five hundred, or even more feet ſpan, the proportions being preſerved by a ſpring one tenth of the ſpan*.

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* When the true principle of building bridges of wood is diſcovered, their progreſſive extenſion is as reaſonable, as the increaſed dimenſions of ſhipping; which, in early ages, was deemed a great work if they amounted to one hundred tons burthen; but time and experience has extended the art of ſhip-building to two thouſand tons; and in the combination and arrangement of the various and complicated parts, there certainly is more genius and labour required than in erecting a bridge of five hundred or one thouſand feet ſpan: but the great demand for ſhipping has rendered the formation familiar, and their increaſed bulk gradually grew into the ſenſes: but had a man, in the infancy of naval architecture, hinted at a veſſel of two thouſand tons, I am inclined to think his cotemporary artiſts would fix him with the gentle appellation of mad-man.

Having made this aſſertion, I almoſt fear I have forfeited the confidence of my reader, who may now be inclined to doubt the ſtability of my ſenſes; but patience ſhould accompany inveſtigation, and I muſt beg of him to proceed to give ſome idea of the proportion of ſuch a bridge of five hundred feet ſpan, fifty feet ſpring, and forty feet broad: take a board eleven feet long, ten inches wide, and half-inch thick, and bend it between two blocks till it riſes twelve inches, and it will give a model of the ſpring of an arch compoſed of two rows of ſtaves, each a foot thick, amounting to two feet in thickneſs; extend this idea, by meaſuring off five hundred feet in a field, and imagining a perpendicular in the centre fifty feet high, then draw a ſegment by the eye, conceive the whole well wedged and bolted together, the proportions of the timbers preſerved, and deliberate on the part where it could give way.